

EVALUATION OF RAFFI'S BURNER APPROACH

It appears that Raffi's approach centers around the concept that the failures are mostly related to thermal degradation from radiant energy while the burners are off-line. This is why he is recommending an initial period of testing and burner balancing prior to installing any new burners. We are convinced that the majority of the problem of thermal degradation comes from flame recirculation during both on-line and off-line conditions. The testing proposed under steps one and two will do nothing to improve situation and is therefore not needed. The balancing and modeling should be done but under the pretext of correcting the following:

1. The burner swirl number should be brought to correct levels of below 0.6 to prevent flame recirculation.
2. The inner air spin vanes should be redesigned to prevent blade stall
3. The position of the spin vanes should be such as to prevent negative pressure gradients into the burner.

Step by step, these are our concerns with his approach:

Step one

1. We have no problem with either 2D or 3D modeling.
2. This is a difficult process that will take as long as 4-5 days with secondary air flow at the end of an outage. This should be done but, only in conjunction with something to solve the major problems of swirl number and blade stall. Balancing by it self will do nothing to resolve the overheating problems. Although we know some imbalance's exist, they are not enough to prevent or cause overheating.
3. Compartmental metering will help with oxygen balancing across the burner front but again does not address the burner thermal problems. This will be very expensive and will take alot of time to design and install. The total cost will be around \$1.5 to \$2 million. This could be handled as a separate project.
4. Dual scanners is a band aid approach. We should stabilize the flame instead. If the flame can't be stabilized then we can look at dual scanners. This again could be a separate project, it's not directly related to burner thermal degradation.
5. We don't know what this will accomplish since B&W does'nt do thermal analysis anyway. This is a B&W recommendation.
6. Increasing cooling air will have large performance penalties and will not solve the primary problem of flame recirculation. Burner degradation will still occur.

7. We do this already as needed.

Step Two

Does nothing to solve the problems. This has been done before. This takes alot of time to do and evaluate. The last testing took over one year to perform and analyze.

Step Three

We have no problem with this, we are already proceeding.

Step Four

The problem with installing a test burner is the time frame required to do testing. Any realistic testing will take at least two years to do.

Step Six

The stabilizer is the only solution to date that addresses the root cause of burner failures. Either another solution needs to be proposed by B&W or testing needs to proceed as soon as possible. See our proposed program.